with 30 published orthoreovirus sequences, including data on all 3 newly obtained sequences from Pekin duck reovirus in China in 2008 and 2011. Phylogenetic relationship was assessed by using the neighbor-joining method based on a Tamura 3-parameter model and bootstrap analysis (1,000 replicates) as implemented in MEGA5 (*8*). The phylogenetic tree shows that the complete sequence of S2 gene is distinct but clusters closely with sequences from all 3 Pekin duck isolates within the ARVs serogroup, which suggests that the novel virus is an ARV-like virus within the genus *Orthoreovirus* (Figure).

In summary, we isolated a novel duck-pathogenic orthoreovirus from the liver of affected Pekin ducks. The regression test in its natural host animal showed that the newly isolated virus caused their deaths. This finding highlights the need to prevent and control this highly transmissible infectious agent. Further study is needed to determine what role the newly isolated DRV played in the 2011 outbreaks on many of the duck farms in China.

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Considerations for Oral Cholera Vaccine Use during Outbreak after Earthquake in Haiti, 2010–2011

To the Editor: We wish to thank Date et al. for their clear discussion of the arguments against the use of oral cholera vaccines (OCVs) in Haiti in 2010–11 (*1*). The epidemic curve in their article suggests that the control activities had an effect on mortality rates, resulting in a decrease in case-fatality rates to <1%. This finding is a remarkable success not achieved during the recent cholera outbreak in Zimbabwe that affected 98,531 persons, of whom 4,282 (4.3%) died (*2*). However, the article does not discuss the lack of effect of the control measures in Haiti on the spread of the epidemic. Considering the failure of containment, it would have been interesting to read how the authors judge the recommendation not to vaccinate, with the benefit of hindsight.

The authors list a catalog of arguments against the use of OCVs in outbreaks. These included the priority of water provision and cholera treatment measures, how modeling data provided no convincing justification for vaccination campaigns, how mobile populations cannot be trusted to take 2 doses, the time for a 2-dose vaccine to generate immunity, the logistic challenges in a setting of inadequate infrastructure and human resources, the cold chain requirements, the difficulty in transport of bulky vaccine, clean water requirements for the buffer, civil

unrest, and an unpredictable response from the public.

Overall, we agree entirely that a mass cholera vaccination campaign is a massive logistic challenge. We do, however, question whether logistic challenges of similar size would stop vaccination campaigns against, e.g., influenza in Hong Kong, People's Republic of China. We are convinced that citizens of Hong Kong and their advocates would not tolerate such arguments regarding challenges. Is it because the at-risk population in Haiti is perceived to have few, if any, powerful advocates that such arguments listed by the Centers for Disease Control and Prevention and the Pan American Health Organization could be applied unchallenged?

A much stronger argument against vaccinations is the limited availability of an appropriate licensed vaccine prequalified for purchase by United Nations agencies. At the start of the outbreak October 2010, only 1 OCV, Dukoral (Crucell, Leiden, the Netherlands), was licensed and prequalified. However, not even 300,000 doses of Dukoral were available at the start of the outbreak. A second OCV, Shanchol (Shantha Biotechnics Ltd., Basheerbagh, Hyderabad, India), was licensed but was prequalified only in September 2011. The bigger question is why the international agencies failed to ensure an appropriate vaccine supply following the catastrophic cholera outbreak in Zimbabwe in 2008–2009. Highly effective OCVs have been licensed since 1991 and are marketed to affluent tourists who are at little, if any, risk of being exposed to cholera. The neglect of OCVs as a public health tool during the past 20 years represents a failure of the cholera experts and policymakers alike. Again, such a failure would be unthinkable for a disease affecting more privileged population groups.

The authors write that the lack of data proving that reactive vaccination campaigns are effective was an argument against the use of OCVs in Haiti. We are in agreement that it is unknown whether a reactive mass cholera vaccination campaign would result in adequate vaccine coverage to provide protection and contain further spread. There are simply no data. It is surprising that the Centers for Disease Control and Prevention and Pan American Health Organization experts did not recognize and use the unique opportunity in Haiti to conduct mass vaccination campaigns for the purpose of collecting such vital data.

Finally, the argument of questionable cost-effectiveness is mentioned by the authors. Indeed, data are lacking on the economic benefits of using OCVs in severe outbreaks, although their cost-effectiveness in cholera-endemic situations has been demonstrated (*3*). We believe that anyone who has lived through the agonizing indignities of a cholera attack, especially during a cholera outbreak, would dismiss the economic argument out of hand. No one should have to suffer, much less to die from a vaccine-preventable and quickly curable disease. Using the argument that vaccinations could be too expensive is morally questionable, if not to say revolting.

We have arrived at the conclusion that the withholding of cholera vaccines during the outbreak in Haiti in 2010–2011 was a judgment error and missed opportunity to collect useful data. We wonder whether this article was written to justify what turns out to be an unsound decision, considering the move by other agencies to proceed with a pilot cholera vaccination campaign (*4*). We believe that persistent neglect of OCV as a public health tool is based on the shortcomings of the current generation of cholera experts and policy makers. The long list of technical reasons provided by the authors regarding why the implementation of mass vaccinations was impossible in Haiti are plausible excuses. However, the true reason that cholera vaccines have not been used in Haiti 20 years after they have been licensed and shown to be effective is the fact that populations affected by cholera outbreaks are underprivileged, even by the standards of impoverished populations. It will take decision makers who are less risk-averse and more compassionate to contain the next cholera outbreak. We hope that future decisions will not be biased by previous untrue dogma that vaccination and other measures such as sanitation and effective treatment would oppose each other when the opposite is true. A more enlightened environment would enable more widespread use of OCVs.

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In Response: Drs. von Seidlein and Deen criticized decisions regarding oral cholera vaccine (OCV) use in Haiti, but acknowledged that there are no data showing that a reactive mass OCV campaign would contain further disease spread (*1*). They agreed that such a campaign is a massive logistic challenge and asserted that the limited supply of World Health Organization (WHO)–prequalified OCV available during the first 11 months of the epidemic in Haiti was an even stronger argument against vaccination. They then asserted that: 1) by "withholding" "highly effective" OCVs during the outbreak in Haiti, an opportunity "to collect data" was missed; 2) the decision not to vaccinate against cholera "was tolerated" because, like other economically disadvantaged populations, "Haitians have few powerful advocates;" and, 3) the limited OCV supply represents a "failure of the current generation of cholera experts and policymakers."

In our institutions' efforts to support national authorities, the welfare of the Haitian people was and remains our primary concern. Our publication describes considerations during the initial response to an expanding epidemic, when the focus was on saving lives; recommendations were revisited after immediate cholera treatment and prevention efforts were successfully established.

As documented in our report (*2*) and in the media (*3*,*4*), the decision at the peak of the epidemic to not use the available doses of WHO-prequalified OCV to vaccinate 150,000 persons (1.5% of the Haitian population) was made by the Haitian government, in the setting of well-publicized differences of opinion among experts. Although this decision may have resulted in "data not being collected," decisions by sovereign governments are rarely overruled by international organizations, scientists or policymakers. Vaccine use without government approval would have raised questions about the appropriateness of using the outbreak to pilot a large-scale reactive cholera vaccination campaign without documented effectiveness.

OCV effectiveness is moderate when compared with measles and rubella vaccines. Although vaccine-preventable diseases, e.g., measles and influenza, are primarily prevented through vaccination, cholera can be prevented and controlled through other means.

It is true that underprivileged, impoverished populations are disproportionately affected by epidemic cholera, as they have been for centuries. This is not for lack of access to OCVs (which are also unavailable in the United States), but because of lack of access to potable water and adequate sanitation. OCVs do have a place in cholera prevention and response, but a greater public health deficit underlies the spread of cholera in Haiti and other countries where it remains endemic or epidemic. Ensuring universal access to safe water and sanitation, beyond recent progress toward meeting the Millennium Development Goals (*5*), is vital for global cholera control. The Pan American Health Organization (PAHO), the United Nations Children's Fund, and the Centers for Disease Control and Prevention (CDC) have called upon the international community to assist Haiti in this effort (*6*).

The issue of OCV availability is being addressed by various public health organizations. In September 2011, WHO convened an expert consultation to discuss the strategic framework for an OCV stockpile (*7*); the second follow-up meeting was planned for April 26–27, 2012, for further action. Recently, the Coalition for Cholera Prevention and Control, funded by the Bill & Melinda Gates Foundation, held an inaugural meeting of cholera and immunization experts and policymakers to develop comprehensive cholera prevention and control strategies that include appropriate use of OCVs in endemic and epidemic settings (*8*). Cholera outbreaks are unpredictable; increased demand from endemic countries can ultimately drive vaccine production, and help maintain a stockpile for outbreak use.

During the past 20 years, a substantial effort has been made by CDC, WHO, PAHO, and private and public partners working with governments to provide existing vaccines in an equitable manner to some of the world's most disadvantaged populations, and to ensure that these populations have equal opportunities to receive new vaccines, such as rotavirus and pneumococcal vaccines (*9*,*10*). New vaccines require greater investments than in the past; criteria such as preventable burden, cost-effectiveness, and sustainability are key to systematic, evidence-based vaccine introductions (*11*,*12*). CDC and PAHO are providing technical and financial assistance to the Haitian government for improving the national vaccine cold chain capacity; launching a measles, rubella and polio catch-up campaign; and introducing pentavalent (diphtheria + tetanus + pertussis + *Haemophilus influenzae* type b + hepatitis B), rotavirus, and pneumococcal vaccines. With approval of the Haitian government, CDC and PAHO have provided technical assistance to 2 organizations implementing small-scale OCV campaigns in Haiti.

Contrary to the authors' suggestion of "unquestioned dogma," the current generation of cholera and immunization experts and policymakers are engaged in developing an evidence-based, integrated approach to cholera prevention and control that will optimize OCV use without neglecting either primary prevention through improvements in water, sanitation, and hygiene, or prevention of cholera-related deaths through improved access

to life-saving treatment. All cholera prevention and control measures for populations at highest risk need the continued support of powerful advocates in the scientific, political, and policy-making spheres.

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